WHAT IS CLAIMED IS:

1. A method of manufacturing a semiconductor device, comprising the steps of:

electrically isolating a diode formation region on a semiconductor substrate by an element isolation layer;

holding, in a vacuum chamber, said semiconductor substrate at which said element isolation layer is formed and an impurity solid including impurity to be introduced into said diode formation region;

introducing inert or reactive gas into said vacuum chamber to generate plasma composed of said inert or reactive gas;

applying to said impurity solid a first voltage which allows said impurity solid to serve as a cathode for said plasma, performing sputtering of said impurity solid by ions in said plasma, and thereby mixing said impurity in said impurity solid into said plasma;

applying to said semiconductor substrate held in said vacuum chamber a second voltage which allows said semiconductor substrate to serve as a cathode for said plasma to cause a potential difference between said plasma and said

semiconductor substrate so that said impurity mixed into said plasma is introduced directly to a surface portion of said diode formation region at said semiconductor substrate to form an impurity layer; and

forming, on said semiconductor substrate at which said impurity layer is formed, an interconnection layer electrically connected to said impurity layer.

2. The method of manufacturing a semiconductor device of claim 1, wherein

said step of introducing said impurity within said plasma onto the surface of the diode formation region of said semiconductor substrate includes, a process of irradiation of a laser beam on said semiconductor substrate.

3. The method of manufacturing a semiconductor device of claim 1, wherein

said impurity layer includes components of said inert or reactive gas.

4. The method of manufacturing a semiconductor device of claim 3, wherein

concentration of the components of said inert or reactive gas exceeds 1 X $10^{20}cm^{-3}$.

5. The method of manufacturing a semiconductor device of claim 1, wherein

each of said first and second voltages is a negative voltage.

6. The method of manufacturing a semiconductor device of claim 1, wherein

said semiconductor substrate is composed of silicon,

said impurity is arsenic, phosphorus, boron, aluminum, antimony, gallium, or indium, and

said inert or reactive gas is gas including nitrogen or argon.

7. A method of manufacturing a semiconductor device, comprising the steps of:

electrically isolating a diode formation region on a semiconductor substrate by an element isolation layer;

holding, in a vacuum chamber, said semiconductor substrate at which said element isolation layer is formed and an impurity solid including impurity to be introduced into said diode formation region;

introducing inert or reactive gas into said vacuum chamber to generate plasma composed of said inert or reactive gas;

applying to said impurity solid a first voltage which allows said impurity solid to serve as a cathode for said plasma, performing sputtering of said impurity solid by ions in said plasma, and thereby mixing said impurity in said impurity solid into said plasma;

applying to said semiconductor substrate held in said vacuum chamber a second voltage which allows said semiconductor substrate to serve as an anode for said plasma to cause a potential difference between said plasma and said semiconductor substrate so that said impurity mixed into said plasma is introduced directly to a surface portion of said diode formation region at said semiconductor substrate to form an impurity layer; and

forming, on said semiconductor substrate at which said impurity layer is formed, an interconnection layer electrically connected to said impurity layer.

8. The method of manufacturing a semiconductor device of claim 7, wherein

said step of introducing said impurity within said plasma onto the surface of the diode formation region of said semiconductor substrate includes, a process of irradiation of a laser beam on said semiconductor substrate.

9. The method of manufacturing a semiconductor device of claim 7, wherein

said impurity layer includes components of said inert or reactive gas.

10. The method of manufacturing a semiconductor device of claim 9, wherein

concentration of the components of said inert or reactive gas exceeds 1 X $10^{20}cm^{-3}$.

11. The method of manufacturing a semiconductor device of claim 7, wherein

said first voltage is a negative voltage.

12. The method of manufacturing a semiconductor device of claim 7, wherein

said second voltage is a voltage of 0 V or lower.

13. The method of manufacturing a semiconductor device of claim 7, wherein

said semiconductor substrate is composed of silicon,

said impurity is arsenic, phosphorus, boron, aluminum, antimony, gallium, or indium, and

said inert or reactive gas is gas including nitrogen or argon.

14. A method of manufacturing a semiconductor device, comprising the steps of:

electrically isolating a diode formation region on a semiconductor substrate by an element isolation layer;

holding, in a vacuum chamber, said semiconductor substrate at which said element isolation layer is formed and an impurity solid including impurity to be introduced into said diode formation region;

introducing inert or reactive gas into said vacuum chamber to generate plasma composed of said inert or reactive gas;

applying to said impurity solid a first voltage which allows said impurity solid to serve as an anode for said

plasma, performing sputtering of said impurity solid by ions in said plasma, and thereby mixing said impurity in said impurity solid into said plasma;

applying to said semiconductor substrate held in said vacuum chamber a second voltage which allows said semiconductor substrate to serve as an anode for said plasma to cause a potential difference between said plasma and said semiconductor substrate so that said impurity mixed into said plasma is introduced directly to a surface portion of said diode formation region at said semiconductor substrate to form an impurity layer; and

forming, on said semiconductor substrate at which said impurity layer is formed, an interconnection layer electrically connected to said impurity layer.

15. The method of manufacturing a semiconductor device of claim 14, wherein

said step of introducing said impurity within said plasma onto the surface of the diode formation region of said semiconductor substrate includes, a process of irradiation of a laser beam on said semiconductor substrate.

16. The method of manufacturing a semiconductor device

of claim 14, wherein

said impurity layer includes components of said inert or reactive gas.

17. The method of manufacturing a semiconductor device of claim 16, wherein

concentration of the components of said inert or reactive gas exceeds 1 X $10^{20}cm^{-3}$.

18. The method of manufacturing a semiconductor device of claim 14, wherein

each of said first and second voltages is a voltage of 0 V or lower.

19. The method of manufacturing a semiconductor device of claim 14, wherein

said semiconductor substrate is composed of silicon,

said impurity is arsenic, phosphorus, boron, aluminum, antimony, gallium, or indium, and

said inert or reactive gas is gas including nitrogen or argon.

20. A method of manufacturing a semiconductor device, comprising the steps of:

electrically isolating a transistor formation region on a semiconductor substrate by an element isolation layer;

forming an electrode at said transistor formation region on said semiconductor substrate at which said element isolation layer is formed, with an insulating layer interposed therebetween;

holding, in a vacuum chamber, said semiconductor substrate at which said electrode is formed and an impurity solid including impurity to be introduced into said transistor formation region;

introducing inert or reactive gas into said vacuum chamber to generate plasma composed of said inert or reactive gas;

applying to said impurity solid a first voltage which allows said impurity solid to serve as a cathode for said plasma, performing sputtering of said impurity solid by ions in said plasma, and thereby mixing said impurity in said impurity solid into said plasma;

applying to said semiconductor substrate held in said

vacuum chamber a second voltage which allows said semiconductor substrate to serve as a cathode for said plasma to cause a potential difference between said plasma and said semiconductor substrate so that said impurity mixed into said plasma is introduced directly to a surface portion of said transistor formation region at said semiconductor substrate to form an impurity layer; and

forming, on said semiconductor substrate at which said impurity layer is formed, an interconnection layer electrically connected to said impurity layer.

21. The method of manufacturing a semiconductor device of claim 20, wherein

said step of introducing said impurity within said plasma onto the surface of the diode formation region of said semiconductor substrate includes, a process of irradiation of a laser beam on said semiconductor substrate.

22. The method of manufacturing a semiconductor device of claim 20, wherein

said impurity layer includes components of said inert or reactive gas.

23. The method of manufacturing a semiconductor device of claim 22, wherein

concentration of the components of said inert or reactive gas exceeds 1 X $10^{20}cm^{-3}$.

24. The method of manufacturing a semiconductor device of claim 20, wherein

each of said first and second voltages is a negative voltage.

25. The method of manufacturing a semiconductor device of claim 20, wherein

said semiconductor substrate is composed of silicon,

said impurity is arsenic, phosphorus, boron, aluminum, antimony, gallium, or indium, and

said inert or reactive gas is gas including nitrogen or argon.

26. A method of manufacturing a semiconductor device, comprising the steps of:

electrically isolating a transistor formation region on a

semiconductor substrate by an element isolation layer;

forming an electrode at said transistor formation region on said semiconductor substrate at which said element isolation layer is formed, with an insulating layer interposed therebetween;

holding, in a vacuum chamber, said semiconductor substrate at which said electrode is formed and an impurity solid including impurity to be introduced into said transistor formation region;

introducing inert or reactive gas into said vacuum chamber to generate plasma composed of said inert or reactive gas;

applying to said impurity solid a first voltage which allows said impurity solid to serve as a cathode for said plasma, performing sputtering of said impurity solid by ions in said plasma, and thereby mixing said impurity in said impurity solid into said plasma;

applying to said semiconductor substrate held in said vacuum chamber a second voltage which allows said semiconductor substrate to serve as an anode for said plasma to cause a potential difference between said plasma and said

semiconductor substrate so that said impurity mixed into said plasma is introduced directly to a surface portion of said transistor formation region at said semiconductor substrate to form an impurity layer; and

forming, on said semiconductor substrate at which said impurity layer is formed, an interconnection layer electrically connected to said impurity layer.

27. The method of manufacturing a semiconductor device of claim 26, wherein

said step of introducing said impurity within said plasma onto the surface of the diode formation region of said semiconductor substrate includes, a process of irradiation of a laser beam on said semiconductor substrate.

28. The method of manufacturing a semiconductor device of claim 26, wherein

said impurity layer includes components of said inert or reactive gas.

29. The method of manufacturing a semiconductor device of claim 28, wherein

concentration of the components of said inert or reactive gas exceeds $1 \times 10^{20} cm^{-3}$.

30. The method of manufacturing a semiconductor device of claim 26, wherein

said first voltage is a negative voltage.

31. The method of manufacturing a semiconductor device of claim 26, wherein

said second voltage is a voltage of 0 V or lower.

32. The method of manufacturing a semiconductor device of claim 26, wherein

said semiconductor substrate is composed of silicon,

said impurity is arsenic, phosphorus, boron, aluminum, antimony, gallium, or indium, and

said inert or reactive gas is gas including nitrogen or argon.

33. A method of manufacturing a semiconductor device, comprising the steps of:

electrically isolating a transistor formation region on a semiconductor substrate by an element isolation layer;

forming an electrode at said transistor formation region on said semiconductor substrate at which said element isolation layer is formed, with an insulating layer interposed therebetween;

holding, in a vacuum chamber, said semiconductor substrate at which said electrode is formed and an impurity solid including impurity to be introduced into said transistor formation region;

introducing inert or reactive gas into said vacuum chamber to generate plasma composed of said inert or reactive gas;

applying to said impurity solid a first voltage which allows said impurity solid to serve as an anode for said plasma, performing sputtering of said impurity solid by ions in said plasma, and thereby mixing said impurity in said impurity solid into said plasma;

applying to said semiconductor substrate held in said vacuum chamber a second voltage which allows said semiconductor substrate to serve as an anode for said plasma to cause a potential difference between said plasma and said semiconductor substrate so that said impurity mixed into said plasma is introduced directly to a surface portion of said

transistor formation region at said semiconductor substrate to form an impurity layer; and

forming, on said semiconductor substrate at which said impurity layer is formed, an interconnection layer electrically connected to said impurity layer.

34. The method of manufacturing a semiconductor device of claim 30, wherein

said step of introducing said impurity within said plasma onto the surface of the diode formation region of said semiconductor substrate includes, a process of irradiation of a laser beam on said semiconductor substrate.

35. The method of manufacturing a semiconductor device of claim 30, wherein

said impurity layer includes components of said inert or reactive gas.

36. The method of manufacturing a semiconductor device of claim 35, wherein

concentration of the components of said inert or reactive gas exceeds 1 X $10^{20}cm^{-3}$.

37. The method of manufacturing a semiconductor device of claim 30, wherein

each of said first and second voltages is a voltage of 0 V or lower.

38. The method of manufacturing a semiconductor device of claim 30, wherein

said semiconductor substrate is composed of silicon,

said impurity is arsenic, phosphorus, boron, aluminum, antimony, gallium, or indium, and

said inert or reactive gas is gas including nitrogen or argon.